Article

Match injuries in professional soccer: inter-seasonal variation and effects of competition type, match congestion and positional role

Carling, C., Orhant, E., and Le Gall, F.

Carling, C. ORCID: 0000-0002-7456-3493, Orhant, E., and Le Gall, F. (2010) Match injuries in professional soccer: inter-seasonal variation and effects of competition type, match congestion and positional role. International Journal of Sports Medicine, 31 (4). pp. 271-276. ISSN 0172-4622

It is advisable to refer to the publisher's version if you intend to cite from the work.
http://dx.doi.org/10.1055/s-0029-1243646

This is a pre-proof corrected manuscript, as accepted for publication, of an article published by Thieme eJournals in *International Journal of Sports Medicine* on 17th February 2010, available online:

https://www.thieme-connect.com/DOI/DOI?10.1055/s-0029-1241212

PLEASE REFER TO THE PUBLISHED VERSION FOR CITING PURPOSES

Match injuries in professional soccer: inter-seasonal variation and effects of competition type, match congestion and positional role

Authors: [1]Christopher Carling, [2]Emmanuel Orhant, [1]Franck Le Gall

Institutions:
[1] *LOSC Lille Métropole Football Club, Domain de Luchin, Camphin-en-Pévèle, 59780, France;*
[2] *Olympique Lyonnais Football Club, 350 avenue Jean Jaurès, 39361, Lyon, Cedex 07, France.*

Correspondance: Christopher Carling, EMSP, LOSC Lille Métropole Football Club, Domain de Luchin, Camphin-en-Pévèle, 59780, France.
Phone: 00.33.1.4891 0793
Fax: 00.33.1.4891 0793
Email: chris.carling@free.fr

Running head: Injury in professional soccer

Abstract

In this prospective observational study, injuries sustained in official match-play in players belonging to a professional soccer club were investigated. Incidence and patterns of injury were compared across four-seasons (2005-2006: S1, 2006-2007: S2, 2007-2008: S3 and 2008-2009: S4) and 3 match formats (domestic League/Cup games and European club competition). In addition, the effects of both fixture congestion and the positional role of players were investigated. Injury incidence (per 1000 match-hours) did not vary between seasons (range 31.2-59.2 observed in S2 and S4 respectively, $p=0.12$) or fixture formats (range 32.6-40.8 observed in European and League matches respectively, $p=0.49$). In contrast, rates varied in players (n=7) who participated in all four seasons as more injuries were sustained in S1 compared to S2 and S3 respectively (88.4 vs. 49.0 vs. 49.2, both $p<0.05$). The incidence of muscle strains was higher in S4 versus S3 (24.7 vs. 9.9, $p<0.05$) as were injuries sustained to the ankle region in S4 versus S2 (15.1 vs. 4.5, $p<0.05$). The incidence of joint sprains differed between fixture formats with a higher rate observed in League versus both Cup and European competition respectively (10.1 vs. 3.0 vs. 3.0, both $p<0.05$). Injury incidence was not associated to the time delay (number of days) separating games ($r=0.04$, $p=0.58$). A very short interval (≤3days) between fixtures did not result in a greater injury rate ($p=0.40$) or number of days lost to injury ($p=0.73$) compared to a longer interval (≥4days). Finally, the incidence of injury and muscle strains (both $p<0.001$) varied across positional roles with the highest rates observed in centre-forwards. These findings provide further knowledge on the risk of injury in contemporary professional soccer match-play and may aid in the care and management of playing resources.

Keywords

Football; Injury incidence; Time-loss injury, Epidemiology, Severity

Introduction

In professional soccer, the risk of injury is considerable and injury is the major single factor affecting player availability [24]. In general, there is a substantially higher risk of sustaining injury in match-play compared to in training. Research at elite levels has reported incidences of injury in match-play ranging from a minimum of 24.6 per 1000 hours exposure in an English professional soccer club [24] to a maximum of 88.7 per 1000 hours exposure in teams competing in FIFA organised and other international tournaments [20]. However, investigations have tended to examine match injuries across one or two seasons [7,8,10,11,13,19,22,24,25] or during tournaments [3,6,14,16,20]. To our knowledge, data on match injury rates collected and compared over multiple seasons are scarce [8,17]. In addition, there is limited information on injury patterns and severity across seasons [8] and further research on inter-seasonal variations in injury is therefore warranted.

In contemporary European professional soccer, teams can participate in up to 70 competitive matches per season [7]. In addition to their League programmes, teams compete in domestic cup competitions and some will participate in European club competitions. It has been suggested that increased exposure time to match-play at the highest levels of European soccer is linked to a high risk of underperformance and injury [5,25]. However, there are no data on injury incidence in these specific forms of match-play and whether they affect overall injury rates across a playing season. This information may aid in determining the playing resources required with regard to injuries across the season especially when participating in additional competitions.

Similarly, fixture congestion is regarded as a threat to team performance and player health [21]. Yet, only limited data are available on the relationship between calendar congestion and injury rates [7]. At professional levels, the performance level of

players in official competition is reduced when the time delay is short between consecutive games [23]. As professional clubs are frequently subjected to playing consecutive games within a tight time frame (e.g. ≤3 days), an investigation examining whether there is an increased risk of injury and whether the severity of injury is greater after a short delay between matches is warranted.

Finally, a limited amount of studies have examined the effects of playing position on the risk of sustaining injury [17,22] and to our knowledge, there is no information on the individual patterns and severity of injuries in match-play. In addition, studies simply differentiate injury between forward, midfield and defending positional groups. Analysis of elite performance suggests that the demands of the game are unique and are dependent upon the precise individual positional role of the player (e.g., separation between central- and wide-midfielders or central-defenders and full-backs) [4,5]. An investigation of injury rates and patterns in match-play according to the precise individual positional role of the player is merited.

The aims of this prospective study of injury rates, patterns and severity in match-play in a professional soccer club were three-fold: 1) to compare injury across four-seasons and three official match formats; 2) to investigate the effects of match congestion on injury; 3) to compare injury according to the individual positional role of the player.

Material and Methods

In this prospective observational study, injuries sustained in players belonging to the first-team squad of a French League-1 Club were diagnosed and documented by the team's physician over four-seasons. Ethics approval was obtained from the internal review board of the sampled football club. This study meets the ethical standards of the

International Journal of Sports Medicine [15]. To ensure team and player confidentiality, all performance data were anonymised before analysis.

The mean squad size over the four-season period was 31.0 ± 2.5 players. Players were categorised into one of six individual playing positions. These positions included: goalkeepers, full-backs, central-defenders, wide- and central-midfielders and centre-forwards [4,5]. Epidemiological data were collected according to the position itself and not the player who played in that role.

Data were captured during the entire 2005-2006, 2006-2007, 2007-2008 and 2008-2009 seasons respectively. In 2005-2006, the club participated in the UEFA Champions League (CL) before entering the UEFA Cup (now the UEFA Europa League). In 2006-2007, the club again participated in the CL and reached the first knockout round after qualifying from the group stage. Exposure time to official competition (Domestic League and Cup and European Competition) was recorded for each individual player.

Only first-team match injuries were considered and inclusion criteria were those injuries leading to a player being unable to fully participate in future training or matches (i.e. time-loss injury). Injuries sustained in players when participating in training sessions or matches for their national team were not included for analysis. The type, location, and severity of the injury (layoff time) were recorded, the latter depending on the number of days the player was absent from and unable to take full part in training or competition. All injuries were followed until the final day of rehabilitation. The player was considered injured until the team physician allowed full participation in collective training and availability for match selection. Finally, the date of each injury was recorded to examine inter-monthly variations in injury incidence across the playing

season. Not examined in this study were the cause of injury and the time period in the match when the injury was sustained.

The methodologies and definitions of injury used in the present study closely follow those recommended by International Soccer Injury Consensus Groups [9,12] and are similar to those employed in other investigations on elite soccer play [3,6,10,11,14,18,19,24,25].

All statistical analyses were conducted using SPSS for Windows Version 14.0 (SPSS Inc., Chicago, IL, USA). Results are reported as means and standard deviations (mean±SD) calculated by conventional procedures unless otherwise stated. The statistical methods applied were frequencies, cross-tabulations and descriptive statistics. Injury incidences are reported as injuries/1000 player match-hours (95% confidence interval) unless otherwise stated. A Kruskal-Wallis One-Way Analysis of Variance on Ranks test was used to compare injury incidences in official competition between seasons and across the three match formats: Domestic League and Cup and European Competition. Follow-up univariate analyses using Tukey's HSD test were employed where appropriate. A Repeated Measures Analysis of Variance on Ranks was used to investigate injury rates in players who participated across all 4 seasons. The relationship between the time delay (in days) separating games and injury incidence was explored using Pearson's product-moment correlation. A Mann-Whitney *U* test was used to test injury incidence and layoff time after a short delay (≤3days) compared to a longer delay (≥4days) between games. The significance level was set at $p<0.05$.

Results

Over the four-seasons, a total of 192 matches were played (Table 1) with a median of 23 matches per player per season (range: 1-48 matches). Players were exposed to a total of 3246.7 hours match-play (range across seasons: 709.8-912.1 hours).

Table 1 about here.

Injury patterns across seasons and competition formats

Across the four seasons, a total of 130 match injuries (40.0%) were classed as time-loss injuries. Incidence of injury according to playing season and match format are presented in Table 1. Injury incidence peaked in the 2008/09 season but did not vary between seasons ($p=0.120$). In contrast, injury incidence varied significantly between seasons in 7 players who participated in all four seasons ($p=0.037$) with a higher rate of injury reported in 2005/06 (88.4) compared to in 2006/07 (49.0) and 2007/08 (49.2) (both $p<0.05$). While injury incidence was highest in League matches, no difference was observed between competition formats ($p=0.496$).

Table 2 reports the nature and anatomic location of injuries across the four-season study period. Traumatic and overuse injuries constituted 84.6% and 15.4% of the total number of injuries respectively. Overall, muscle strains were the most common type of injury sustained (33.9%) followed by joint sprains (22.3%) and contusions/haematomas (20.0%). Injuries to the knee region (21.5%) were most common followed by the ankle (20.0%) and the lower leg (10.0%) regions. Of the strains, 58.8% affected the upper leg and 11.0% the lower leg while sprains (69.0%) and contusions (34.6%) mostly concerned the ankle and knee respectively.

Due to small numbers, the rates of only the most common injury types (contusions, sprains and strains) and locations (ankle, knee, lower leg, hamstring and

groin) were compared between seasons and match formats. Muscle strains varied across seasons ($p=0.043$) with a higher incidence observed in 2008/09 versus 2007/08 (24.7 vs. 9.9, $p<0.05$). Similarly, there was a difference between seasons in the incidence of ankle injuries ($p=0.037$) as more injuries to this region were sustained over the 2008/09 season compared to the 2006/07 season (15.1 vs. 4.5, $p<0.05$). While the occurrence of joint sprains varied according to match format ($p=0.042$) with a higher incidence observed in League versus both Cup and European competition (10.1 vs. 3.0 vs. 3.0, both $p<0.05$), there was no difference between competition formats in the rate of injury to any of the five anatomic locations.

Table 2 about here.

Overall, the mean layoff time per injury was 15 ± 26 days. While no significant difference was reported between seasons for the mean layoff time per injury ($p=0.242$), values varied substantially (range: 8 ± 7 days in 2006/07 to 24 ± 20 days per injury in 2007/08. Similarly, no difference between seasons in mean layoff time was reported in 7 players who participated in all four seasons ($p=0.278$). Again, while no difference was observed in mean layoff time per injury between competition formats ($p=0.184$), a considerably longer layoff was observed in League Competition (15 ± 29 days) compared to Cup games (9 ± 8 days).

Inter-seasonal variations and effects of match congestion

The overall incidence of injury varied between months ($p<0.001$) and peaked in March (59.6 per 1000 hours exposure) and was lowest in May (19.9 per 1000 hours exposure) (Figure 1).

Over the four year period, the mean recovery time between games was 5 ± 3 days. Altogether, 76 games were played with a short time interval (≤3days) and 116 games with a longer interval (≥4days) separating competition. No association was observed between the time interval separating games and injury incidence (r=0.038, p=0.581). Similarly, no difference (p = 0.406) was observed in the incidence of injury after a short interval separating games (45.0 ± 54.6 per 1000 hours, 0.8 ± 0.9 injuries per match) compared to that after a longer interval (37.7 ± 48.4 per 1000 hours, injuries 0.6 ± 0.8 per match). Altogether, 57 injuries (43.8% of the total) were sustained after a short interval separating games of which 57.9% were sustained by a player who had played in both games. In comparison, 73 injuries (56.2% of the total) were sustained after a longer interval of which 67.1% were incurred in a player who had played in both games. Layoff time per injury was identical (15 ± 25 days vs. 15 ± 28 days, p=0.730) between consecutive games separated by a short versus a longer interval.

Figure 1 about here.

Positional differences

Table 3 reports the overall incidence of injury, mean layoff time per injury and the most common types of injury sustained according to positional role. A difference in the overall incidence of injury was observed between positional roles (p<0.001) with centre-forwards recording the highest rate (post hoc differences from p<0.05 to p<0.001 versus other positional roles). While the mean injury layoff duration did not vary between positional roles (p=0.544), there was a difference in the incidence of muscle strains (p<0.001) with the highest rate of these injuries reported in centre-forwards (post hoc versus all positional roles, p<0.001). Muscle strains were the most common injury

across all positional roles except in central-defenders in whom sprains were more frequently observed. No differences were reported for any of the injury locations across playing positions.

Table 3 about here.

Discussion

The aim of this four-season study on injury rates and patterns in a professional soccer club was to examine inter-seasonal variations in match injuries and the effects of match type, fixture congestion and positional role on injury. Results showed that incidence and severity of match injury did not vary between seasons and were not influenced by competition format. In contrast, the incidence of injury varied across seasons in players who participated in all four seasons. The incidence of muscle strains and injuries to the ankle regions differed across seasons as did the rate of joint sprains between fixture formats. Injury rates were not associated to the time interval between games and a very short interval between fixtures did not result in a higher injury risk or layoff time. A higher overall risk of sustaining injury and muscle strains in particular was observed in centre-forwards compared to the other positional roles.

In the present club, the overall incidence of match injury (40.5) was substantially higher than rates previously reported for other professional soccer clubs in equivalent European Leagues [8,18,24,25]. Regional differences in injury incidences and patterns due to playing style or intensity and climate may explain this discrepancy [25]. However, the stable injury incidence over the study period is in agreement with the results of two recent studies in that injury rates in other professional European soccer clubs were stable over a two- [13] and seven-season period respectively [8]. This

finding is noteworthy and suggests that the risk of sustaining injury in players in the present club whilst higher than that reported in other professional clubs, has not changed over a four-season period. In contrast, the significant inter-seasonal variation in injury rate observed in players who participated in all four seasons is noteworthy. Similarly, the significant difference between seasons in muscle strains and injuries to the ankle region for the entire squad is of interest and is in accordance with previous research that patterns of injury can vary across seasons [8,13]. Hägglund and co-workers [13] suggested that disparities in injury patterns may reflect natural variations across seasons or differences in the study environment. Another possible explanation for the present inter-seasonal variations may be changes in coaching staff and training methods or player turnover. Indeed, the former has a major influence on injury prevention especially in the design of training programmes and the safety culture it promotes [26]. Nevertheless, these findings suggest the need for a prolonged injury study period to ensure consistent, in-depth, and accurate injury profiles in elite soccer. The findings also emphasise the permanent need for individualised monitoring of injury rates and patterns as well as the implementation and evaluation of injury prevention measures.

Participation in top European Competition did not result in a higher overall injury rate across seasons as no differences in injury incidence were observed in these matches compared to League games. In addition, the severity of injury did not vary according to competition format. These results imply that participation in other forms of competition did not influence the risk or seriousness of injury in the present elite footballers and also suggests that the club coped well with the additional burden of European competition and domestic Cup matches. However, the chance of sustaining a joint sprain was dependent on fixture format with the highest rate observed in domestic

League games. It is difficult to suggest valid reasons for this discrepancy and further research is merited especially in regard to the causes of these injuries across the different competition formats.

In this study and in general accordance with the medical literature, injury rates and patterns varied substantially over the course of the playing season with overall injury incidence peaking in March. However, no association was observed between the time delay separating games and injury rate. Similarly, when the team was forced to play consecutive games separated by a short interval (≤3days), injury rate and layoff time were comparable to those after a longer interval (≥4days). This result implies that congested periods of match-play did not increase injury risk or severity. The club's player rotation policies and/or recovery strategies may be a reasonable explanation for this result. These findings lend support to findings in professional Spanish soccer in that the results of teams in official competition are not affected by fixture congestion and that players are quite capable of coping with a busy match schedule.[21] Findings from this study may therefore assure coaches, support staff and players alike that in a professional setting, high-performance soccer players can cope with a congested playing calendar. Further research is nevertheless warranted to investigate the injury risk in 'star' players who may participate more frequently in consecutive matches within a tight time frame over the course of the season.

Previous studies examining injuries in American Major League Soccer [22] and the English Premier League [18] demonstrated no effect of four typical playing positions (goalkeeper, defender, midfielder and forward) on the occurrence of injury. The finding that centre-forwards in the present club incurred more injuries and sprains in particular compared to other positional roles is therefore noteworthy. This result suggest that future studies should analyse injury according to the precise positional role

of the player as well as demonstrating a need for injury prevention training schemes to be tailored to the individual positional role. However, care is needed when interpreting these findings as injury rates and patterns were investigated according to the position itself and on several occasions over the course of the season, players were rotated across positions and may have found themselves in an unfamiliar positional role. Similarly, some players may have changed playing positions during matches when substitutions or changes in team formation were made. Further research is therefore required to discern whether the position itself was the potential risk factor or whether certain individuals across teams were simply more at risk of injury.

A limitation of the present study was that the cohort included players from only one soccer club and the patterns observed may only be a reflection of this particular team. Consequently, the findings may not be applicable to other elite soccer clubs. Similar investigations involving a substantially larger sample of clubs to increase statistical power and more injury cases to allow comparisons of variations in all injury types and locations are therefore warranted. In addition, match exposure time and injuries sustained in players with national team obligations and their links with the issue of match congestion were not examined. A previous study showed that half of players belonging to teams that participated in Champions League football were exposed to international duties and 4% of all injuries occurred under these circumstances [25]. Furthermore, in order to suggest preventive strategies specific to soccer, it is necessary to have detailed information combining game-specific and medical information on risk factors for injury [1] and the mechanisms involved in match-play injuries [2] which were not recorded in the present study. Nevertheless, the obvious strength of this investigation is its long-term span and prospective nature. Also, the present study methodology closely respects internationally recommended injury recording systems

[9,12] specifically developed to address injury in soccer allowing the results to be compared to current and future research into soccer injuries.

Conclusion

In professional soccer, continuous data over several seasons are needed to observe the development of specific trends over time, but also to screen for areas of concern and form injury prevention hypotheses. This study has shown that while the risk and severity of injury has not changed over a four-year period and that the present club coped well with a congested match calendar, patterns of injury can vary over time and may depend on the types of fixture played or the precise positional role of the player. Taken in total, the data from this study provide sports medicine practitioners with useful information concerning the injury consequences of the game of soccer and may aid medical and coaching staff in the care and management of playing resources.

References

1.Arnason A, Sigurdsson SB, Gudmundsson A, Holme I, Engebretsen L, Bahr R. Risk factors for injuries in football. Am J Sports Med 2004; 32(1 Suppl): 5S-16S.

2.Arnason A, Tenga A, Engebretsen L, Bahr R. A prospective video-based analysis of injury situations in elite male football. Am J Sports Med 2004; 32: 1459-1465

3. Babwah, TJR. Incidence of Football Injury during International Tournaments. Res Sports Med 2009; 17: 61-69

4. Carling C, Orhant, E. Variation in body composition in professional soccer players: inter- and intra-seasonal changes and the effects of exposure time and player position. J Strength Cond Res (In press).

5. Di Salvo V, Gregson W, Atkinson G, Tordoff P, Drust B. Analysis of high intensity activity in Premier League soccer. Int J Sports Med 2009; 30: 205-212.

6. Dvorak J, Junge A, Grimm K, Kirkendall D. Medical report from the 2006 FIFA World Cup Germany. Br J Sports Med 2007; 41: 578-581

7. Ekstrand J, Waldén M, Hägglund M, A congested football calendar and the wellbeing of players: Correlation between match exposure of European footballers before the World Cup 2002 and their injuries and performances during that World Cup. Br J Sports Med 2004; 38: 493-497

8. Ekstrand J, Hägglund M, Waldén M. Injury incidence and injury patterns in professional football-the UEFA injury study. Br J Sports Med doi:10.1136/bjsm.2009.060582

9.Fuller CW, Ekstrand J, Junge A, et al. Consensus statement on injury definitions and data collection procedures in studies of football (soccer) injuries. Br J Sports Med 2006; 40: 193-201

10. Hägglund M, Waldén M, Ekstrand J. Injury incidence and distribution in elite football-a prospective study of the Danish and the Swedish top divisions. Scand J Med Sci Sports. 2005; 15: 21-28
11. Hägglund M, Waldén M, Ekstrand J. Injuries in Swedish elite football-a prospective study on injury definitions, risk for injury and injury pattern during 2001. Scand J Med Sci Sports 2005; 15: 118-125
12. Hägglund M, Walden M, Bahr R, Ekstrand J. Methods for epidemiological study of injuries to professional football players: developing the UEFA model. Br J Sports Med 2005; 39:340-346
13. Hägglund M, Waldén M and Ekstrand J. Previous injury as a risk factor for injury in elite football: a prospective study over two consecutive seasons. Br J Sports Med 2006; 40: 767–772
14. Hägglund M, Waldén M, Ekstrand J. UEFA injury study, an injury audit of European Championships 2006 to 2008. Br J Sports Med 2009; 43: 483-489
15. Harriss DJ, Atkinson G. International Journal of Sports Medicine - Ethical Standards in Sport and Exercise Science Research. Int J Sports Med 2009; 30: 701-702.
16. Hawkins RD, Fuller CW. Risk assessment in professional football: an examination of accidents and incidents in the 1994 World Cup finals. Br J Sports Med 1996;30:165–70.
17. Hawkins RD, Fuller CW. An examination of the frequency and severity of injuries and incidents at three levels of professional football. Br. J. Sports Med. 1998;32;326-332
18. Hawkins RD, Fuller CW. A prospective epidemiological study of injuries in four English professional football clubs. Br J Sports Med 1999; 33: 196-203

19. Hawkins RD, Hulse MA, Wilkinson C, Hodson A, Gibson M. The association football medical research programme: an audit of injuries in professional football. Br J Sports Med 2001; 35: 43-47
20. Junge A, Dvorak J, Graf-Baumann T, Peterson L. Football injuries during FIFA tournaments and the Olympic Games, 1998-2001: development and implementation of an injury-reporting system. Am J Sports Med 2004; 32(1 Suppl):80S-9S
21. Lago-Peñas, C. Consequences of a busy soccer match schedule on team performance: Empirical evidence from Spain. International SportMed Journal 2009; 10: 86-94
22. Morgan BE, Oberlander MA. An Examination of Injuries in Major League Soccer: The Inaugural Season. Am J Sports Med 2001; 29: 426-430
23. Odetoyinbo K, Wooster B, Lane A. The effect of a succession of matches on the activity profiles of professional soccer players. In: Science and Football VI. (ed Reilly, T & Korkusuz, F). Routledge, UK, 2007; 105-108
24. Parry L, Drust B. Is injury the major cause of elite soccer players being unavailable to train and play during the competitive season? Phys Ther Sport 2006; 7: 58-64
25. Walden M, Hägglund M, Ekstrand J, UEFA Champions League study: A prospective study of injuries in professional football during the 2001-2002 season. Br J Sports Med 2005; 39: 542-546
26. Woods C, Hawkins R, Hulse M, Hodson A. The Football Association Medical Research Programme: an audit of injuries in professional football-analysis of preseason injuries. Br J Sports Med 2002; 36: 436-441

Table 1 Incidence of match injury across playing seasons and match formats.

Incidences include 95% confidence intervals.

Means ± standard deviations.

Table 2 Incidence of injury according to anatomic location and type across playing seasons.

*p<0.05 compared to 2006/07 season.

Table 3 Incidence, layoff time per injury and common types of injury across positional roles.

Incidences include 95% confidence intervals.

Means ± standard deviations.

*p<0.001 compared to goalkeepers, p<0.01 compared to central-defenders and wide-midfielders, p<0.05 compared to fullbacks and central-midfielders.

#p<0.001 compared to all other positional roles.

Figure 1 Seasonal disposition of overall injury incidence and incidence of traumatic and overuse injuries

Table 1 Incidence of match injury across playing seasons and match formats.

Season	Total			League			Domestic Cup			European Competition		
	Games	Injuries	Incidence	Games	Injuries	Incidence	Games	Injuries	Incidence	Games	Injuries	Incidence
2005-2006	**54**	**36**	**39.5 (26.6-52.4)**	**38**	**25**	**39.0 (23.7-54.3)**	**6**	**4**	**39.4 (0.8-77.9)**	**10**	**7**	**41.5 (10.7-72.2)**
2006-2007	**53**	**28**	**31.2 (19.6-42.8)**	**38**	**23**	**35.8 (13.6-32.4)**	**5**	**1**	**11.8 (-11.4-34.9)**	**10**	**4**	**23.7 (0.5-46.9)**
2007-2008	**42**	**23**	**32.4 (19.2-45.6)**	**38**	**21**	**32.7 (12.0-30.0)**	**4**	**2**	**29.6 (-11.4-70.7)**	**_**	**_**	**_**
2008-2009	**43**	**43**	**59.0 (17.6-76.6)**	**38**	**36**	**55.9 (24.2-47.8)**	**5**	**7**	**82.6 (21.4-143.8)**	**_**	**_**	**_**
Mean per season	**48.0 ± 6.4**	**32.5 ± 8.8**	**40.5 (33.5-47.5)**	**38 ± 0.0**	**26.3 ± 6.7**	**40.8 (33.0-48.6)**	**5.0 ± 0.8**	**3.5 ± 2.6**	**40.7 (19.4-62.0)**	**10 ± 0.0**	**5.5 ± 2.1**	**32.6 (21.4-43.8)**

Incidences include 95% confidence intervals.

Means ± standard deviations.

Table 2 Incidence of injury according to anatomic location and type across playing seasons.

	2005/06		2006/07		2007/08		2008/09		All seasons	
Injury location and type	**N**	**Incidence**	**N**	**Incidence**	**N**	**Incidence**	**N**	**Incidence**	**N**	**Incidence**
Knee	**12**	**13.2**	**4**	**4.5**	**4**	**5.6**	**8**	**11.0**	**28**	**8.6**
Sprain	4	4.4	1	1.1	2	2.8	1	1.4	8	2.5
Tendinopathy	2	2.2	0	0.0	0	0.0	1	1.4	3	0.9
Chrondopathy	0	0.0	2	2.2	1	1.4	2	2.7	5	1.5
Meniscus	2	2.2	0	0.0	0	0.0	1	1.4	3	0.9
Contusion/haematoma	4	4.4	1	1.1	1	1.4	3	4.1	9	2.8
Ankle	**6**	**6.6**	**4**	**4.5**	**5**	**7.0**	**11**	**15.1***	**26**	**8.0**
Sprain	4	4.4	3	3.3	4	5.6	9	12.3	20	6.2
Tendinopathy	0	0.0	0	0.0	1	1.4	0	0.0	1	0.3
Fracture	1	1.1	0	0.0	0	0.0	1	1.4	2	0.6
Contusion/haematoma	1	1.1	1	1.1	0	0.0	1	1.4	3	0.9
Lower leg	**1**	**1.1**	**6**	**6.7**	**2**	**2.8**	**4**	**5.5**	**13**	**4.0**
Strain	1	1.1	4	4.5	2	2.8	4	5.5	11	3.4
Tendinopathy	0	0.0	1	1.1	0	0.0	0	0.0	1	0.3
Contusion/haematoma	0	0.0	1	1.1	0	0.0	1	1.4	2	0.6
Groin	**1**	**1.1**	**2**	**2.2**	**1**	**1.4**	**8**	**11.0**	**12**	**3.7**
Strain	0	0.0	2	2.2	1	1.4	7	9.6	10	3.1
Tendinopathy	1	1.1	0	0.0	0	0.0	1	1.4	2	0.6
Hamstring	**5**	**5.5**	**2**	**2.2**	**1**	**1.4**	**3**	**4.1**	**11**	**3.4**
Strain	3	3.3	2	2.2	1	1.4	3	4.1	9	2.8
Tendinopathy	2	2.2	0	0.0	0	0.0	0	0.0	2	0.6
Quadriceps	**3**	**3.3**	**1**	**1.1**	**1**	**1.4**	**4**	**5.5**	**9**	**2.8**
Strain	1	1.1	1	1.1	1	1.4	3	4.1	6	1.8
Tendinopathy	1	1.1	0	0.0	0	0.0	0	0.0	1	0.3
Contusion/haematoma	1	1.1	0	0.0	0	0.0	1	1.4	2	0.6
Abdomen/thorax	**2**	**2.2**	**1**	**1.1**	**2**	**2.8**	**0**	**0.0**	**5**	**1.5**
Strain	1	1.1	1	1.1	1	1.4	0	0.0	3	0.9
Contusion/haematoma	1	1.1	0	0.0	1	1.4	0	0.0	2	0.6
Foot	**1**	**1.1**	**1**	**1.1**	**2**	**2.8**	**2**	**2.7**	**6**	**1.8**
Contusion/haematoma	1	1.1	1	1.1	1	1.4	2	2.7	5	1.5
Other overuse	0	0.0	0	0.0	1	1.4	0	0.0	1	0.3
Back/neck	**1**	**1.1**	**1**	**1.1**	**3**	**4.2**	**0**	**0.0**	**5**	**1.5**

Back/neck pain	1	1.1	1	1.1	2	2.8	0	0.0	4	1.2
Strain	0	0.0	0	0.0	1	1.4	0	0.0	1	0.3
Hand	**2**	**2.2**	**1**	**1.1**	**1**	**1.4**	**0**	**0.0**	**4**	**1.2**
Fracture	2	2.2	1	1.1	1	1.4	0	0.0	4	1.2
Pelvis	**2**	**2.2**	**0**	**0.0**	**0**	**0.0**	**1**	**1.4**	**3**	**0.9**
Strain	2	2.2	0	0.0	0	0.0	1	1.4	3	0.9
Head/Face	**0**	**0.0**	**0**	**0.0**	**1**	**1.4**	**1**	**1.4**	**2**	**0.6**
Fracture	0	0.0	0	0.0	0	0.0	1	1.4	1	0.3
Contusion/haematoma	0	0.0	0	0.0	1	1.4	0	0.0	1	0.3
Hip	**0**	**0.0**	**2**	**2.2**	**0**	**0.0**	**0**	**0.0**	**2**	**0.6**
Contusion/haematoma	0	0.0	2	2.2	0	0.0	0	0.0	2	0.6
Shoulder	**0**	**0.0**	**1**	**1.1**	**0**	**0.0**	**1**	**1.4**	**2**	**0.6**
Sprain	0	0.0	1	1.1	0	0.0	1	1.4	2	0.6
Arm	**0**	**0.0**	**1**	**1.1**	**0**	**0.0**	**0**	**0.0**	**1**	**0.3**
Fracture	0	0.0	1	1.1	0	0.0	0	0.0	1	0.3

*p<0.05 compared to 2006/07 season.

Table 3 Incidence, layoff time per injury and common types of injury across positional roles.

Playing position	Injuries			Incidence		
	Total	Incidence	Layoff duration (days)	Strains	Sprains	Contusions
Goalkeepers	**7**	**23.8 (6.2-41.4)**	**16.1 ± 11.8**	**13.7 (0.3-27.1)**	**0.0**	**0.0**
Fullbacks	**24**	**41.0 (24.6-57.4)**	**23.4 ± 8.1**	**12.0 (3.1-20.9)**	**10.2 (2.0-18.4)**	**12.0 (3.1-20.9)**
Central-defenders	**21**	**35.7 (20.4-51.0)**	**12.9 ± 49.1**	**6.8 (0.1-13.5)**	**13.7 (4.2-23.2)**	**10.3 (2.1-18.5)**
Central midfielders	**30**	**36.3 (23.3 (49.3)**	**11.5 ± 19.8**	**12.5 (4.8-20.2)**	**7.5 (1.5-13.5)**	**5.0 (0.1-9.9)**
Wide-midfielders	**19**	**32.2 (17.7-46.7)**	**10.8 ± 13.8**	**12.0 (3.1-20.9)**	**6.8 (0.1-13.5)**	**10.2 (2.0-18.4)**
Forwards	**29**	**77.2 (49.1-105.3)***	**18.6 ± 29.2**	**32.1 (13.9-50.3)#**	**13.4 (1.6-25.1)**	**8.0 (-1.1-17.1)**

Incidences include 95% confidence intervals.

Means ± standard deviations.

*p<0.001 compared to goalkeepers, p<0.01 compared to central-defenders and wide-midfielders, p<0.05 compared to fullbacks and central-midfielders.

#p<0.001 compared to all other positional roles.

Figure 1 Seasonal disposition of overall injury incidence and incidence of traumatic and overuse injuries.